Pino, M., Cuadrado, C., Chacón, J., Rodríguez, P., Fatás, E., & Ocón, P. (2014). The electrochemical characteristics of commercial aluminum alloy electrodes for Al/air batteries. *Journal of Applied Electrochemistry*, *44*(12), 1371–1380. <https://doi-org.ezproxy.jccmi.edu/10.1007/s10800-014-0751-6>

Author Mikel Pino and his associates published the journal article “The electrochemical characteristics of commercial aluminum alloy electrodes for Al/air batteries.” His abstract best describes the article. There is a recent resurgence in studying Aluminum Air Batteries because of the abundance of the metal and its light weight advantages. Scientists are working to overcome slow rates of oxygen reduction at the anode and cathode as they study implementation of materials such as silver. If scientists overcome the current issues with this battery concept, aluminum air batteries can revolutionize energy storage. Keep an eye on this one.

# Author Mike Pino published several articles pertaining to electrodes, commercial aluminum alloys, and their use in aluminum air batteries. His research was conducted at the University Autonoma de Madrid and other places from 2008 forward.

# NOTES

To develop new materials for Al/**air** **batteries**, the evaluation and characterisation of commercial **aluminium** alloys, namely, Al2000, Al2000Clad and Al7000, as anodes in alkaline electrolyte **batteries** has been performed. Their self-corrosion rate, hydrogen evolution rate and electrochemical properties, including open circuit potentials, polarisation characteristics and potentiodynamic measurements, were examined in a 4 M KOH solution. Among the tested alloys, Al2000 was found to be the most promising because it exhibits a high open circuit potential, a good anode efficiency and a minimum corrosion rate. Al2000/NiOOH and Al2000/**air** **batteries** were tested. Electrolyte concentrations between 0.01 and 4 M KOH were studied, and discharge currents between 0.8 and 20 mA cm were imposed to analyse the evolution of the E. Conversely, the Al7000 alloy exhibited the highest corrosion rate and H evolution compared to the other alloys. [ABSTRACT FROM AUTHOR]

“Aluminum–air batteries are considered as next‐generation batteries owing to their high energy density with the abundant reserves, low cost, and lightweight of aluminum. However, there are several hurdles to be overcome, such as the sluggish rate of the oxygen reduction reaction (ORR) at the air electrode, precipitation of aluminum hydroxides and oxides at the anode, and severe hydrogen evolution problems at the interface of the anode and the electrolyte. Here, recent advances in silver metal and metal–nitrogen–carbon‐based ORR electrocatalysts, aluminum anodes, electrolytes, and the requirements of future research directions are mainly summarized.”

**Authors:**

[Pino, Mikel](javascript:__doLinkPostBack('','ss~~AU%20%22Pino%2C%20Mikel%22%7C%7Csl~~rl','');)1

**Abstract**

The aluminum–air battery is an attractive candidate as a metal–air battery because of its high theoretical electrochemical equivalent value, 2.98 A h g−1, which is higher than those of other active metals, such as magnesium (2.20 A h g−1) and zinc (0.82 A h g−1). This paper provides an overview of recently developed materials for aluminum–air batteries to be used in various elements, including the anode, air cathode and electrolyte. Aluminum can be alloyed with other active metal elements such as Tin (Sn), [Indium](https://www.sciencedirect.com/topics/chemical-engineering/indium) (In), [Gallium](https://www.sciencedirect.com/topics/chemical-engineering/gallium) (Ga) and Zinc (Zn). Its binary and tertiary alloys demonstrate improved battery performance. Bifunctional air cathodes fabricated using oxygen reduction reaction (ORR) catalysts, CoO/N-CNT with oxygen evolution reaction (OER) catalysts, Ni–Fe-layered double hydroxide/CNT and MnO2/N-CNT yield excellent results. With regard to electrolytes, several types have been considered: aqueous, non-aqueous, aprotic solvent and solid-state electrolytes. The addition of corrosion inhibitors to an aqueous electrolyte helps to enhance battery performance, whereas non-aqueous and aprotic solvent electrolytes can be used to prevent hydrogen evolution. Polymer electrolytes can overcome the battery leakage problem. As a conclusion, the future research trends related to this type of battery have also been indicated.